METHOD AND APPARATUS FOR SELECTIVE AND QUANTITATIVE RIGHTS MANAGEMENT

BACKGROUND OF THE INVENTION

1. Technical Field:

5   The present invention relates generally to an improved data processing system, and in particular to a method and apparatus for processing data. Still more particularly, the present invention provides a method, apparatus, and computer implemented instructions for managing rights to services provided over a network data processing system.

2. Description of Related Art:

10   The Internet, also referred to as an "internetwork", is a set of computer networks, possibly dissimilar, joined together by means of gateways that handle data transfer and the conversion of messages from a protocol of the sending network to a protocol used by the receiving network. When capitalized, the term "Internet" refers to the collection of networks and gateways that use the TCP/IP suite of protocols.

15   The Internet has become a cultural fixture as a source of both information and entertainment. Many businesses are creating Internet sites as an integral part of their marketing efforts, informing consumers of the products or services offered by the business or providing other information seeking to engender brand loyalty. Many federal, state, and local government agencies are also employing Internet sites for informational purposes, particularly agencies that must interact with virtually all segments of society such as the Internal Revenue Service and secretaries of state. Providing informational guides and/or searchable databases of online public records may reduce operating costs. Further, the

Internet is becoming increasingly popular as a medium for commercial transactions.

Currently, the most commonly employed method of transferring data over the Internet is to employ the World Wide Web environment, also called simply "the Web". Other Internet resources exist for transferring information, such as File Transfer Protocol

5   (FTP) and Gopher, but have not achieved the popularity of the Web. In the Web environment, servers and clients effect data transaction using the Hypertext Transfer Protocol (HTTP), a known protocol for handling the transfer of various data files (e.g., text, still graphic images, audio, motion video, etc.). The information in various data files is formatted for presentation to a user by a standard page description language, the Hypertext

10   Markup Language (HTML). In addition to basic presentation formatting, HTML allows developers to specify "links" to other Web resources identified by a Uniform Resource Locator (URL). A URL is a special syntax identifier defining a communications path to specific information. Each logical block of information accessible to a client, called a "page" or a "Web page", is identified by a URL. The URL provides a universal, consistent

15   method for finding and accessing this information, not necessarily for the user, but mostly for the user's Web "browser". A browser is a program capable of submitting a request for information identified by an identifier, such as, for example, a URL. A user may enter a domain name through a graphical user interface (GUI) for the browser to access a source of content. The domain name is automatically converted to the Internet Protocol (IP) address

20   by a domain name system (DNS), which is a service that translates the symbolic name entered by the user into an IP address by looking up the domain name in a database.

The Internet also is widely used to transfer applications to users using browsers. With respect to commerce on the Web, individual consumers and businesses use the Web to purchase various goods and services. In offering goods and services, some companies offer

25   goods and services solely on the Web while others use the Web to extend their reach.

With respect to the offering of services, many of these services are rights-based services in which a user temporarily or permanently acquires rights to use this service for

a fee. These services may include, for example, a music service, a book service, a video service, or a stock research service. With a music service, a user may be entitled to download and receive various music titles. A user may receive books through a book service or movies through a video service. Various articles and historical data may be

5   available to a user through a stock research service.

The manner in which rights are defined and managed are important with these types of services. Rights are acquired in exchange for payment or promise of payment; rights are revoked at the end of a service period. Rights are usually considered to be binary: either the user has the rights or not. It is customary for the service provider to

10   grant rights to a prospective user, either for a limited period of time ("trial period") or for a restricted version of the service ("limited function") to allow the user to experience the service as a prelude to a more comprehensive commitment. It is also customary for the service provider to allow the user to retain rights to use the service for a short time ("grace period") after the end of the normal period of subscription. In all of these cases

15   the rights to use the service are binary. When the user continues to retain rights to the service, the service provider may provide notices that the agreement or service period has terminated and that the user needs to re-sign or restart the agreement or service period. This, however, often does not provide sufficient incentive for the user to sign another agreement or continue paying for the service. If the service is terminated, the user may

20   then re-sign or restart the service. In some cases, however, the user may find it easier to re-sign with another service provider.

Therefore, it would be advantageous to have an improved method, apparatus, and computer implemented instructions for selective and quantitative rights management to retain users of a service.

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SUMMARY OF THE INVENTION

The present invention provides for a method, apparatus, and computer implemented instructions for managing rights to a service in a data processing system. A request is received from a user for the service. The rights to the service are identified.

5   Content for the service is received. The content is selectively modified based on the rights identified, or other attributes of the service such as the immediacy and predictability of the service is selectively modified based on the rights identified, and the content is sent to the user.

BRIEF DESCRIPTION OF THE DRAWINGS

The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself, however, as well as a preferred mode of use, further objectives and advantages thereof, will best be understood by reference to the

5 following detailed description of an illustrative embodiment when read in conjunction with the accompanying drawings, wherein:

Figure 1 depicts a pictorial representation of a network of data processing systems in which the present invention may be implemented;

Figure 2 is a block diagram of a data processing system that may be implemented

10 as a server in accordance with a preferred embodiment of the present invention;

Figure 3 is a block diagram of a service provider system in accordance with a preferred embodiment of the present invention;

Figure 4 depicts an entry in a rights management database in accordance with a preferred embodiment of the present invention;

15 **Figure 5** is a diagram illustrating example entries in a fulfillment database in accordance with a preferred embodiment of the present invention;

Figure 6 is a diagram illustrating example entries in a policy database in accordance with a preferred embodiment of the present invention;

Figure 7 is a diagram illustrating a service manifest subsystem in accordance with

20 a preferred embodiment of the present invention;

Figure 8 is a flowchart of a process used for managing rights to a service in accordance with a preferred embodiment of the present invention; and

Figure 9 is a flowchart of a process used for selectively modifying content for use in manifesting a service in accordance with a preferred embodiment of the present

25 invention.

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention recognizes that it would be advantageous to service

providers and perhaps to users if rights to use a service were more flexibly defined. For

example, these rights may be defined in which the terms of rights have a continuous or

5   discrete set of values, rather than a binary value in which the service is present or absent

in its entirety. One example is a music service that allows a user to play music from a

library of recordings. One attribute of this music service that may be varied is the quality

level of the music. The quality level may be varied in terms of factors, such as, for

example, the frequency response, distortion level, or signal-to-noise ratio of the music

10   provided to the user. If the user is granted less than full rights to use this service, one

manifestation of these quantitative rights could be degraded fidelity in the playing of the

music. The service provider can manipulate the quantitative right in order to achieve

business objectives.

Typically, a quantitative right grants a degraded service level to the user, but this

15   is not always the case. The service may be provided at its maximum service level for a

limited period of time, or the responsiveness of the service may be decreased, or the range

of options, such as, in the example above, reducing the number of recordings in the

library.

This notion of a quantitative right makes possible new, advantageous behaviors of

20   the service. These behaviors may be advantageous to the user, to the service provider, or

to both. As an example, consider the behavior of the music service at the end of the

user's subscription period. Without quantitative rights, the service provider has two

options: terminate the service completely or continue the service for a grace period. The

provider's motivations are to stimulate the user to renew the service. Neither of the

25   available options directly addresses these motivations: if the service is terminated, the

user will have to face its unavailability, but that very unavailability may drive the user to

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seek options other than renewal. If the service is continued then the user has no motivation to renew.

With quantitative rights mechanism of the present invention, the service provider may gradually reduce the user's rights to the service, such as, degrading the fidelity of the

5   music progressively. The user is reminded of the value of the service. Specifically, the user still hears the music, but is provided an incentive to renew the service and to restore the quality of the music to its former level. Similarly, during an initial trial period, the service provider may grant a quantitative right to the user that limits the range of available music while not limiting the display of options. This implementation provides

10   the user an incentive to pay for full rights to the service so as to gain access to all of the available selections.

With reference now to the figures, **Figure 1** depicts a pictorial representation of a network of data processing systems in which the present invention may be implemented. Network data processing system **100** is a network of computers in which the present

15   invention may be implemented. Network data processing system **100** contains a network **102**, which is the medium used to provide communications links between various devices and computers connected together within network data processing system **100**. Network **102** may include connections, such as wire, wireless communication links, or fiber optic cables. Network data processing system **100** illustrates a system in which selective and

20   quantitative rights management of the present invention may be implemented.

In the depicted example, server **104** is connected to network **102** along with storage unit **106**. In addition, clients **108, 110,** and **112** are connected to network **102**. These clients **108, 110,** and **112** may be, for example, personal computers or network computers. In the depicted example, server **104** provides services to clients **108-112**. Clients **108, 110,**

25   and **112** are clients to server **104**. Network data processing system **100** may include additional servers, clients, and other devices not shown. In the depicted example, network

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data processing system **100** is the Internet with network **102** representing a worldwide collection of networks and gateways that use the TCP/IP suite of protocols to communicate with one another. At the heart of the Internet is a backbone of high-speed data communication lines between major nodes or host computers, consisting of thousands of

5   commercial, government, educational and other computer systems that route data and messages. Of course, network data processing system **100** also may be implemented as a number of different types of networks, such as for example, an intranet, a local area network (LAN), or a wide area network (WAN). **Figure 1** is intended as an example, and not as an architectural limitation for the present invention.

10   Referring to **Figure 2**, a block diagram of a data processing system that may be implemented as a server, such as server **104** in **Figure 1**, is depicted in accordance with a preferred embodiment of the present invention. Data processing system **200** may be a symmetric multiprocessor (SMP) system including a plurality of processors **202** and **204** connected to system bus **206**. Alternatively, a single processor system may be employed.

15   Also connected to system bus **206** is memory controller/cache **208**, which provides an interface to local memory **209**. I/O bus bridge **210** is connected to system bus **206** and provides an interface to I/O bus **212**. Memory controller/cache **208** and I/O bus bridge **210** may be integrated as depicted.

Peripheral component interconnect (PCI) bus bridge **214** connected to I/O bus **212**

20   provides an interface to PCI local bus **216**. A number of modems may be connected to PCI local bus **216**. Typical PCI bus implementations will support four PCI expansion slots or add-in connectors. Communications links to clients **108-112** in **Figure 1** may be provided through modem **218** and network adapter **220** connected to PCI local bus **216** through add-in boards.

25   Additional PCI bus bridges **222** and **224** provide interfaces for additional PCI local buses **226** and **228**, from which additional modems or network adapters may be supported.

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In this manner, data processing system **200** allows connections to multiple network computers. A memory-mapped graphics adapter **230** and hard disk **232** may also be connected to I/O bus **212** as depicted, either directly or indirectly.

Those of ordinary skill in the art will appreciate that the hardware depicted in

5   **Figure 2** may vary. For example, other peripheral devices, such as optical disk drives and the like, also may be used in addition to or in place of the hardware depicted. The depicted example is not meant to imply architectural limitations with respect to the present invention.

The data processing system depicted in **Figure 2** may be, for example, an IBM

10   e-Server pSeries system, a product of International Business Machines Corporation in Armonk, New York, running the Advanced Interactive Executive (AIX) operating system or LINUX operating system.

With reference now to **Figure 3**, a block diagram of a service provider system is depicted in accordance with a preferred embodiment of the present invention. More

15   specifically, service provider system **300** in **Figure 3** illustrates a configuration for service rights management. Through service provider system **300**, one or more services may be offered to users with quantitative rights management. Service provider system **300** includes service manager **302**, fulfillment subsystem **304**, service delivery subsystem **306**, service manifest subsystem **308**, and policy database **310**. Fulfillment system **304**

20   includes directory management component **312** and user database **314**.

Service manager **302** provides the means by which manager **316** may interact with fulfillment subsystem **304** to manage rights for various users who subscribe to the service or services being offered. Specifically, service manager **302** may present a graphical user interface (GUI) to manager **316** allowing manager **316** to grant or revoke rights. If

25   manager **316** is a computerized subsystem, service manager **302** may present an application programming interface (API) or messaging interface to manager **316**. Service

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manager **302** interprets the actions of manager **316** and interacts with fulfillment
subsystem **304** to grant or revoke rights. In these examples, the identification of users
and rights are stored in user database **314**. The information in user database **314** is
managed through directory management component **312**.

5   In Web site design, fulfillment subsystem **304** is often implemented as a directory,
specifically a directory implementing the lightweight directory access protocol (LDAP).
Service manager **302** uses LDAP to communicate with directory management component
312 of the directory, which in turn, alters data stored in user database **314**. As an
example, **Figure 4** depicts an entry in a rights management database, such as user
10   database **314** in **Figure 3**. Entry **400** contains user identification field **402**, other
information field **404**, service value field **406**, service value field **408**, and service value
field **410**. User identification field **402** is used to identify a user. This field is typically
designated as a primary key by which the database can be searched. Other information
field **404** contains information, such as demographic or preference information. Service
15   value fields **406**, **408**, and **410** contain rights information pertaining to services offered to
the user. If the rights were only a binary rights system, these fields need only hold one of
two values, indicating that rights have been granted or not granted for the given user to
the respective service. In the present invention, however, these rights may range through
various values between granted and not granted for a particular service. Additionally,
20   although three fields are shown, these fields are presented only for purposes of illustration
and other numbers of fields may be used depending on the particular implementation.

Turning back to **Figure 3**, service delivery subsystem **306** uses the LDAP protocol
to access fulfillment subsystem **304**. Each attempt by user **318** to use a service requires
that service delivery subsystem **306** ascertain the identity of the user and the service,
25   which is desired. This information is used by service delivery subsystem **306** to access
fulfillment subsystem **304** with a query, using the LDAP protocol. The result of the query

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is to return the value of a selected field, such as service value field **406**, service value field **408**, and service value field **410** in **Figure 4**, according to the service desired. If the returned field indicates that the given user has rights to the desired service, service delivery subsystem **306** can then proceed to deliver the desired service to user **318**.

5   Service delivery subsystem **306** may contain storage devices containing content for delivery to a user in response to a request for a service. This content may be, for example, music, video, electronic books, or Web pages. Alternatively, service delivery subsystem **306** may retrieve content from other sources outside of service provider system **300**.

10   Service delivery subsystem **306** passes content retrieved in response to a request to service manifest subsystem **308**, which manifests or delivers the content for the service to user **318**. User **318** accesses the service through service manifest subsystem **308**. The purpose of service manifest subsystem **308** is to modulate the presentation of the service to user **318** in accordance with the quantitative right stored for that service in a directory

15   entry, such as entry **400** in **Figure 4**.

Service manifest subsystem **308** can manifest or provide the service in many ways, some of which have been previously described. The selection of the specific manifestation of the service is identified by consulting policy database **310**. In these examples, a set of rules are stored in policy database **310**. Each rule determines the way

20   in which the service will be manifested to user **318**. For example, one rule may direct service manifest subsystem **308** to add noise to reproduced music if the user's rights are less than complete. This rule may consult other databases, customizing the service manifestation on such factors as the status of the user as a preferred or non-preferred user, the set of other services to which the user is subscribed, the financial status of the user,

25   and the like. In the depicted examples, user **318** and service delivery subsystem **306** communicate using the HTTP.

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In this example, service delivery subsystem **306** is unaffected by the specific choice made by service manifest subsystem **308** to select the way the service is to be presented to user **318**. This configuration is desirable because the configuration separates the implementation of service delivery subsystem **306** from the specific ways in which a

5   quantitative right is granted to user **318**. The specific way in which a content for a service is modified before it is presented to user **318** is determined by the combination of service manifest subsystem **308** and policy database **310**.

Quantitative rights, represented by sets of service values in entry **400** in **Figure 4** may represent other modifications to service delivery. For example, they may represent a

10   priority for temporarily blocking service to a given user. Users with more rights to a given service may be the last to be deprived of that service given conditions of resource exhaustion within the Web site. Users with the fewest rights to a given service may be the first to see their service suspended if the service provider needs to free resources to serve others.

15   With reference now to **Figure 5**, a diagram illustrating example entries in a fulfillment database is depicted in accordance with a preferred embodiment of the present invention. In this example, entries **500** are examples of user identification and service value information, which may be found in a fulfillment database, such as user database **314** in **Figure 3**. In this example, one service value is associated with each user

20   identification. If a particular user requests the service, the user identification in the request received from the user is used as a key or index to identify the appropriate entry. In these examples, the value for the service is identified as being a value ranging from 1 – 4. This value is used by a service manifest subsystem, such as service manifest subsystem **308** in **Figure 3**, to determine the appropriate manner in which the content is

25   to be delivered to the user.

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Turning next to **Figure 6**, a diagram illustrating example entries in a policy database is depicted in accordance with a preferred embodiment of the present invention. In this example, entries **600** are examples of entries that may be found in a policy database, such as policy database **310** in **Figure 3**. Each entry includes a value and a rule. These rules are directed towards handling of audio content in these examples. The value, in this example, serves as an index or key to identify a rule that is to be applied to manifesting a service to a user.   In this example, entry **602** indicates that no modification is to be made to the content. Entry **604** indicates that noise is to be added to the content. Entry **606** indicates only 80 percent on the content is to be delivered, and entry **608** indicates that the service is only to be provided after 8 p.m. The particular entries are identified from a service value returned from a user database, such as user database **314** in **Figure 3**.

With reference now to **Figure 7**, a diagram illustrating a service manifest subsystem is depicted in accordance with a preferred embodiment of the present invention. Service manifest subsystem **700** may be implemented as a service manifest subsystem, such as service manifest subsystem **308** in **Figure 3**. Service manifest subsystem **700** is used as an intermediary between service delivery subsystem **702** and user **704**, acting as a proxy for both.

Service manifest subsystem **700** includes service manifest processors (SMPs) **706**, **708, 710, 712, 714**, and **716**. These processors are used to process content for delivery to user **704**. Service manifest subsystem **700** also includes switches **718, 720, 722, 724, 726**, and **728**. These switches are used to direct content received from service delivery subsystem **702** to different processors within service manifest subsystem **706**. These switches then direct the content to user **704**. In other words, these switches are used to define paths within service manifest subsystem **700**.

Service identifier **730** contains an identification of the service currently being provided to user **704**. This service identifier is obtained from a request from user **704**. The identification of the user is used to obtain a service value associated with the user for the identified service from a user database, such as user database **314** in **Figure 3**. This

5 service value is used to identify a rule, such as policy **732**. Policy **732** contains information obtained from a search of a policy database, such as policy database **310** in **Figure 3**. This information in policy **732** is used to selectively modify content for delivery to a user. Service identifier **730** controls switches **718** and **724**, which select paths through service manifest subsystem **700**. Policy **732** controls switches **720, 722,**

10 **726,** and **728** for sub-paths, selecting service manifest processors **706, 708,** and **710,** and service manifest processors **712, 714** or **716**. Service manifest processor **706, 708,** and **710** are located in one path, while service manifest processors **712, 714,** and **716** are located in another path. Each path is for a particular type of service. The different service manifest processors, located within sub-paths for each path, are used to handle

15 different types of modifications of content based on the quality of service that is to be provided to a user. Thus, the combination of service identifier **730** and policy **732** selects one unique path through service manifest subsystem **700** between service delivery subsystem **702** and user **704**.

Service manifest processors **706, 708, 710, 712, 714,** and **716** perform distinct

20 operations on the data that flows from service delivery subsystem **702** to user **704**. For example, if the service is music delivery and the policy directs the addition of noise to the data representing music, the policy database might contain a policy that selects service manifest processor **706**, whose function is to add noise to music samples. Other service manifest processors may interrupt the flow of music samples at certain times of the day,

25 or may act on the forms representing music selections to limit the number that can be selected by the user.

The illustration of service manifest subsystem **700** is illustrated for purposes of illustration only and not as a limitation to the particular manner in which this subsystem may be implemented. In particular, the processing may be handled through a single processor other than those shown in **Figure 7**. Additionally, although only two paths are

5   shown, corresponding to two distinct services, other numbers of paths may be used depending on the particular implementation.

Turning next to **Figure 8**, a flowchart of a process used for managing rights to a service is depicted in accordance with a preferred embodiment of the present invention. The process illustrated in **Figure 8** may be implemented in a service provider system,

10   such as service provider system **300** in **Figure 3**.

The process begins by receiving a request for service from a user (step **800**). Next, rights associated with the user are identified (step **802**). These rights may be identified through a user database, such as user database **314** in **Figure 3**. A determination is made as to whether rights for the user are present (step **804**). If user

15   rights are present, the service is delivered based on the identified rights to service (step **806**) with the process terminating thereafter. If user rights are not present, an error message is returned (step **808**) and the process terminates. In the second case when user rights are absent, the user has no service agreement with the provider or the service agreement has expired for such a long time that service is no longer provided.

20   With reference now to **Figure 9**, a flowchart of a process used for selectively modifying content for use in manifesting a service is depicted in accordance with a preferred embodiment of the present invention. The process illustrated in **Figure 9** may be implemented in a service manifest subsystem, such as service manifest subsystem **308** in **Figure 3**.

25   The process begins by requesting a content using a service identification (step **900**). Next, content is received (step **902**). A database is queried for handling of the

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content (step **904**), and a result is received (step **906**). Then, the content is selectively modified using the result to generate a response (step **908**). A response is sent to the user (step **910**) and the process terminates.

5   The mechanism of the present invention may be applied to many specific business applications of the present invention. Specifically, in the case of the subscription computing or outsourced information technology business, the user of various services (anti-virus, backup, support) can be granted quantitative rights and the mechanisms described in this embodiment can be used to enforce them. Less-than-full rights may be applied to other services, such as subscription computing services, which may include, for 10   example, back-up services, anti-virus services, and support services.

       The mechanism of present invention provides a method, apparatus, and computer implemented instructions for handling quantitative rights. The mechanism of the present invention provides a flexible implementation of quantitative rights, such that as the service provider varies the degree of the right, the manifestation of that variance can take 15   alternative forms. The choice of the alternative can be based on many factors, but this choice does not complicate the manipulation of the right: the provider merely increases the level of the right granted, or increases the degree to which the right has been revoked. Since the manipulation (or management) of the right is the subject of one business process (namely service provisioning) and the manifestation of quantitative rights is the 20   subject of another (policy) this separation of management and manifestation is beneficial.

       It is important to note that while the present invention has been described in the context of a fully functioning data processing system, those of ordinary skill in the art will appreciate that the processes of the present invention are capable of being distributed in the form of a computer readable medium of instructions and a variety of forms and that 25   the present invention applies equally regardless of the particular type of signal bearing media actually used to carry out the distribution. Examples of computer readable media include recordable-type media, such as a floppy disk, a hard disk drive, a RAM,

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CD-ROMs, DVD-ROMs, and transmission-type media, such as digital and analog communications links, wired or wireless communications links using transmission forms, such as, for example, radio frequency and light wave transmissions. The computer readable media may take the form of coded formats that are decoded for actual use in a

5 particular data processing system.

The description of the present invention has been presented for purposes of illustration and description, and is not intended to be exhaustive or limited to the invention in the form disclosed. Many modifications and variations will be apparent to those of ordinary skill in the art. The embodiment was chosen and described in order to

10 best explain the principles of the invention, the practical application, and to enable others of ordinary skill in the art to understand the invention for various embodiments with various modifications as are suited to the particular use contemplated.